TABLE 7
REMEDIAL ALTERNATIVES FOR MAHONING RIVER SEDIMENTS
PROJECT COMPONENT OPTIONS AND ASSUMPTIONS

Option	Description	Cost	Advantages	Disadvantages	Technical Analysis
I. REMOVAL ALTERNATIVE					
DREDGING METHODS					
1. Hydraulic Dredging	Dredge sediments from a barge, or from a tracked vehicle where barge cannot be used. Pump sediment up to two miles to holding basins.	$10-11 per cubic yard (not including construt. of holding basins)	1. Least expensive dredging method 2. Excludes large rocks and debris	1. Incorporates large amounts of water 2. Requires holding basins within 2 miles of dredging, or pump booster stations	Technically feasible and appropriate. This is a recommended option included in the cost estimate.
2. Mechanical Dredging	Dredge sediments from a barge, or from a tracked vehicle where barge cannot be used, with a clamshell dredge. Truck to a single large holding basin.	$12-16 per cubic yard (not including construt. of holding basin)	1. Incorporates less water than hydraulic dredge. 2. Requires only one holding basin.	1. More expensive than hydraulic dredging.	Technically feasible and appropriate. This is a recommended option included in the cost estimate.
MITIGATION MEASURES					
1. Oil Booms	Deploy booms on water surface downstream of dredging	Nominal	1. A low cost, effective mitigation measure		Technically feasible and appropriate. Recommended.
2. Silt Curtains	Deploy silt curtains across river downstream of dredging	Nominal	1. A low cost, effective mitigation measure		Technically feasible and appropriate. Recommended.
3. Coffer Cells	Construct closed cell around dredging	Not Determined		1. More expensive and involved than the other mitigation measures.	Technically feasible and appropriate but not recommended unless other mitigation measures are inadequate.
ADDITION OF RIVERBED SUBSTRATE					
1. Distribute road-bed material through river	As sections of road are abandoned, the road bed material should be distributed across the channel to augment the river substrate	Nominal (included in the dredging cost)	1. An inexpensive way to replace some of the river substrate removed by dredging		Technically feasible and appropriate. Recommended.

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HANDLING AND DEWATERING OF DREDGED MATERIAL					
Storage					
1. Construct holding basins at 4-mile intervals	Construct eight holding basins at four-mile intervals to store dredged sediment. This layout is appropriate for hydraulic dredging. Flow rate of water from holding basins estimated at 200 GPM	$11-16 per cubic yard of holding volume constructed		1. More expensive than construction of one large basin.	Technically feasible and appropriate. This is a recommended option included in the cost estimate.
2. Construct one large holding basin	Construct one large holding basin to store dredged sediment. This layout is appropriate for mechanical dredging.	$11-16 per cubic yard of holding volume constructed	1. Less expensive than construction of eight smaller basins.		Technically feasible and appropriate. This is a recommended option included in the cost estimate.
Dewatering					
1. Settling and draining directly from holding basin	Holding basins constructed with a gravel base for removing water. Possibly also pumps and hoses for drawing water off of the top after settling	see Water Treatment	1. Much lower cost than mechanical dewatering options.	1. May be adversely impacted by bad weather 2. May require long time period to achieve adequate dewatering	Technically feasible and appropriate. This is a recommended option included in the cost estimate.
2. Natural drying	Drying which occurs simply by allowing water to evaporate from sediments. Probably used in conjunction with settling and draining	see Water Treatment	1. Much lower cost than mechanical dewatering options.	1. May be adversely impacted by bad weather 2. May require long time period to achieve adequate dewatering	Technically feasible and appropriate. This is a recommended option included in the cost estimate.
3. Other dewatering options (filter press, centrifuge, evaporators, stabilization with amendments).	Feed dredged sediment through dewatering equipment adjacent to holding basin, probably housed in temporary structure.	Depends on initial water content. Minimum of $10 per cubic yard	1. Faster and more effective than natural drying methods.	1. Expensive 2. Requires O&M 3. Probably requires on-site structures	Selected options could be technically feasible and appropriate. Not recommended unless natural dewatering options are inadequate. Not included in cost estimate.

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TREATMENT AND DISPOSAL					
1. Landfilling	Excavate dried material from holding areas, and truck to BFI Carbon Limestone Landfill	$18/Ton Disposal $5.50-$10/Ton hauling	1. Lowest cost disposal alternative 2. No regulatory uncertainty		Technically feasible and appropriate. This is a recommended option included in the cost estimate.
2. Bioremediation 2a. Grace DARAMEND	Add amendment to the sediment in situ, till to a maximum depth of 26".	$25-75/Ton	1. Thorough drying not required, as procedure stabilizes soil.	1. Does not treat metals contamination 2. Requires in-place closure	Technically feasible and appropriate but not currently recommended. Not included in the cost estimate.
2b. Waste Stream Tech. Bioblends	Add amendment to the sediment in situ, till to a maximum depth of 18-24".	$26/Ton	1. Low cost	1. Thorough drying required 2. Does not treat metals contamination 2. Requires in-place closure	Technically feasible and appropriate but not currently recommended. Not included in the cost estimate.
3. Thermal Treatment (Soil Remediation, Inc.)	Truck material to treatment site in Warren. Place in thermal treatment unit.	About $30/Ton	1. Might allow beneficial reuse.	1. Thorough drying required 2. Not clear what would be done with sediment after treatment 3. Would require permitting 4. Does not treat metals contamination	Technically feasible and appropriate but not currently recommended. Not included in the cost estimate.

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TREATMENT OF SUPERNATENT WATER					
1. Oil-Water separator	Pump water to an oil-water separator before discharge to river.	$30,000 for pump and oil-water sep.			Technically feasible and appropriate. This is a recommended option included in the cost estimate.
2. Sand or Carbon Filtration	Pass water through filtration system prior to discharge to the river.	Not Determined			Technically feasible and appropriate but not recommended unless other treatment measures are inadequate.
3. Send water to POTW	Pump water to a POTW for treatment prior to discharge.	Not Determined		1. Would require pumping water long distance	Technically feasibility uncertain (not known if any POTW would accept water).
II. ISOLATION ALTERNATIVE					Not included in cost estimate.
1. AquaBlok	Cover the river bed, or selected portions of it, with AquaBlok, which is a mixture of bentonite and other material.	$5-$15 per cubic yard depending on thickness	1. Low cost, which would not increase if sediment were thicker than expected.	1. No prior history of use in a similar setting 2. May require maintenance 3. Suitability as a substrate for benthic organisms uncertain	Technical feasibility uncertain. Not recommended at this time and not included in the cost estimate.